

1 APPARATUS, KIT AND METHOD FOR REPAIRING A SURFACE BREAK IN

2 SELECTED SURFACES OF AN TRANSPARENT OBJECT

3 Background of the Invention

4 The present invention relates to a resin chamber construction,
5 kit and method for repairing a selected break from the surface, of
6 a transparent automobile light bulb housing, an automobile light
7 lens, or a plate of glass or plastic.

8 The repair of plate glass and automobile light housings whether
9 lenses or housings and plate glass is complex, expensive and
10 fraught with permutations and combinations of physical and visual
11 problems. A spectrum of the situations can be found in Jacino U.S.
12 Patents No. 4,200,478, 4,961,883, 5,209,935, 5,401,152, 6,074,852
13 and PCT Application PCT/US99/25472, all incorporated by reference.

14 The present invention including a new resin chamber
15 construction, enables a new ability for the repair of plate glass
16 and automobile light housings whether lenses or housings and plate
17 glass. The repair is effected on a surface and adapts to the
18 provision of grid patterns and color.

19 Another unexpected aspect of the present invention is that the
20 repair can be effected in situ without physical removal of the
21 repaired object such as a lightbulb housing, lens or pane of plate
22 glass.

23 Description of the Related Art

1 In the past, automobile light bulb housings lenses have been
2 repaired by covering the housings with tape just to protect them
3 from the atmosphere.

4 The tape has been either opaque or translucent. Tapes used in
5 such repair have even been selected to match the color of the
6 broken part of the lens. To repair voids, repairs have been made
7 by the flush filling of the broken spaces; plastic castings were
8 also made to fill breaks. Many different techniques were used.

9 U.S. Patent No. 4,497,755 discloses a kit for the repair of
10 automobile light bulb housing lenses by casting the repair. The
11 repair method includes the use of flush tapes to form a
12 releasable form for molding an exothermic adhesive resin to make
13 a repair. Colored resin was used to match colors in the
14 automobile plastic light bulb housing and glass bead were used
15 to simulate the facets in the broken diffuse area.

16 As shown in U.S Patent No. 5,401,157, breaks through glass
17 have been repaired by providing a gasket with a cover to form a
18 mold for a casting including a bead surrounding a repaired area.
19 The gasket and cover define the shape of the repair casting.

20 U.S. Patent No. 4,200,478 discloses a pedestal adapted to
21 create a casting to override and surround a break in glass.

22 U.S. Patent No. 3,887,413 discloses a method for repairing
23 plastic materials, using an insert backing material, protective

1 paste and graining paper and uses a hot surface, such as iron.
2 See Fig. 1. A flat backing material is used to hold the heat
3 responsive elastic repair material flush with the surface of the
4 patched area.

5 U.S. Patent No. 3,772,114 discloses a process for mending
6 fabrics, including the use of an adhesive which contains a color
7 additive to match the area around the repair. The invention is
8 involved with fitting in a flush patch supported on one side.

9 U.S. Patent No. 3,388,016 discloses a method and apparatus
10 for patching articles. The method and apparatus are a complex
11 set to apply a fiber glass patch to one surface. Flush liners
12 may be used.

13 U.S. Patent No. 3,109,765 discloses a method for repairing
14 surfaces, wherein a textured backing is used. A textured backing
15 hold holds a composition applied from an outer surface of a
16 rupture.

17 U.S. Patent No. 4,961,883 discloses a pedestal and a seal
18 surrounding an opening and forming a chamber for the
19 introduction of a repair plastic, forming an irregular bead,
20 which has to be cut off flush. The bead is formed in the central
21 opening 20.

22 U.S. Patent No. 4,473,419 discloses the use of a flush patch
23 to a contoured surface for the purpose of making a repair.

1 U.S. Patent No. 3,138,505 discloses means for mending fabric,
2 using a heat responsive thermoplastic adhesive backed by a
3 substrate which may be stripped, then bonding a matching patch
4 to the fabric and the adhesive. The patch is ironed on.

5 U.S. Patent No. 3,841,932 discloses a surface patch for
6 windshield glass, which leaves a superficial dam which is
7 removed.

8 U.S. Patent No. 3,914,145 discloses a flush patch casting for
9 the repair of plate glass.

10 U.S. Patent Number 4,147,576 is a substantially invisible PVC
11 auto body non transparent repair over a damaged area.

12 U.S. Patent Number 4,094,316 is a decorative applique overlay
13 adherable to bandage.

14 U.S. Patent Number 4,588,619 is a reflective panel for
15 diffusion of light in an automotive lens housing.

16 U.S. Patent Number 4,221,465 is a patching tape to alter the
17 light transmissive characteristics of a view graph.

18 U.S. Patent Number 4,661,182 is a non transparent
19 substantially invisible surface repair of the damaged glossy
20 surface of an auto body.

21 U.S. Patent Number 2,833,327 is a laminated tire patch with
22 an adhesive layer.

23 U.S. Patent Number 3,939,337 is an elastomeric gasket for a

1 light housing assembly for mounting a lens.

2 Summary of the Invention

3 According to the present invention, a resin chamber
4 construction, and a kit and method are provided for repairing for
5 repairing a break from a selected surface, particularly a
6 transparent surface such as the lens of an automobile light bulb
7 housing, an automobile light lens, a plate of glass or plastic, in
8 situ substantially maintaining the selected light diffusion
9 characteristics of the original article.

10 The resin chamber is the enablement when used with a cover to
11 seal a surface break. The resin chamber construction includes, the
12 chamber, a flange portion, to be sealed around the break, at least
13 one air vent and a pouring spout.

14 In its simplest form, a repair can be performed with a cover
15 sealing the outer surface of the break and the chamber portion of
16 the resin chamber construction sealed, spaced away from the
17 sealing cover and surrounding its outer periphery.

18 The kit includes the resin chamber construction, sealing cover,
19 a peripheral adhesive sealing gasket, a push pin and a resin
20 container. The kit is preferably mounted on a display card with
21 blister pack. In other variations the kit may include a selection
22 of pigment colors.

23 The resin chamber construction can be an integral part of an

1 enclosing blister on the kit package. The resin chamber
2 construction can also include a diffusion pattern to match the
3 pattern of the lens or housing repaired.

4 The method includes the steps of sealing a break with a sealing
5 cover, selecting a resin chamber construction to form a mold for
6 the resin that effects the repair, filling the resin into the
7 resin chamber construction. It is important for the resin chamber
8 construction to extend beyond the periphery of the cover over the
9 break. A sealing gasket may be used for convenience, particularly
10 when the resin chamber construction is an integral part of the kit
11 blister pack, and it is cut out of the blister for use.

12 Brief Description of the Drawing

13 Although such novel feature or features believed to be
14 characteristic of the invention are pointed out in the claims, the
15 invention and the manner in which it may be carried out may be
16 further understood by reference to the description following and
17 the accompanying drawings.

18 Fig. 1 is a plan view of the resin chamber construction of the
19 present invention.

20 Fig. 2 is a top view of Fig. 1.

21 Fig. 3 is a left side view of Fig. 1

22 Fig. 4 is a detail showing a front elevation of a bullseye
23 break in a glass headlight housing.

1 Fig. 5 is a detail view of the bulls eye break as shown in Fig.
2 4 overlain with a transparent adhering cover.

3 Fig. 6 is a detail section of Fig. 5 at lines 6 - 6.

4 Fig. 7 Is a detail of a headlight repair with a resin chamber
5 construction of the present invention engaged over the transparent
6 adhering cover of Fig. 6 and filled with resin.

7 Fig. 8 shows the molded bead formed in Fig. 7 with the resin
8 chamber construction removed.

9 Figs. 9 is a section of Fig. 8 at lines 9 - 9 showing the
10 completed repair.

11 Fig. 10 is a section of an alternate repair configuration
12 particularly for use with plate glass.

13 Figs. 11 - 17 are the elements of a kit of the present
14 invention for repairing a break in a headlight housing or a lens.

15 Fig. 11, is an isometric view of a resin chamber construction
16 including a grid pattern molded into the resin chamber.

17 Fig. 12 is a front elevation of a gasket for use with the resin
18 chamber construction of Fig. 11.

19 Fig. 13 is a detail schematic right side elevation of the
20 gasket of Fig. 12.

21 Fig. 14 is a cover for the sealing of the outer opening of a
22 break through the transparent surface particularly of a lens or a
23 glass bulb housing, shown mounted on a release sheet.

24 Fig. 15 is a detail schematic right side elevation of Fig. 14.

25 Fig. 16 is a push pin for a kit of the present invention.

1 Fig. 17 is a resin container for a kit of the present
2 invention.

3 Fig. 18 is a blister pack kit of the present invention mounted
4 on a cut away display card including all the elements shown in
5 Figs. 11 - 17.

6 Figs. 19 - 26 are the elements of another kit of the present
7 invention.

8 Fig. 19 is another embodiment of a resin chamber construction
9 of the present invention including a grid pattern.

10 Fig. 20 is a right side elevation of a Fig. 19.

11 Fig. 21 is a cover for the sealing of the opening of a break
12 through a transparent surface, mounted on a release sheet.

13 Fig. 22 is a right side elevation of a Fig. 21.

14 Fig. 23 is a front elevation of gasket for use with the resin
15 chamber construction of Fig. 19.

16 Fig. 24 is a right side elevation of a Fig. 23.

17 Fig. 25 is a pair of syringes for a selected sealing resin for
18 a repair of the present invention.

19 Fig. 26 is a pair of syringes for selected pigments for the
20 sealing resin of the present invention.

21 Fig. 27 shows the mounting of the cover of Fig. 21 over a break
22 to be repaired.

23 Fig. 28 shows cutting the cover to remove the excess.

24 Fig. 29 shows the placing of the gasket of Fig. 24 around the
25 cover.

1 Fig. 30 shows mounting the resin chamber construction on the
2 mounted gasket of Fig. 29.

3 Fig. 31 shows the filling of a syringe from a mixing
4 receptacle.

5 Fig. 32 shows the injection of the resin into the resin chamber
6 construction of Fig. 19.

7 Description of the Preferred Embodiment

8 Referring now to the figures in greater detail, where like
9 reference numbers denote like parts in the various figures.

10 The resin chamber construction 10 as shown in Fig. 1 comprises
11 an integral peripheral flange portion 11, a resin chamber 12, a
12 flange portion 11, a tab 13, a pouring spout 14 and at least one
13 vent 15. The flange portion 11 includes an adhesive layer 16.

14 At least the resin chamber 12 is preferably transparent. As
15 shown in Fig. 1, the resin chamber construction 10 is a unitary
16 molded transparent plastic. The vents 15 and pouring spout 14 open
17 into the resin chamber 12. The vents 15 have openings 17 to the
18 atmosphere. The pouring spout 14 has an opening 18 open to the
19 atmosphere.

20 As shown in the detail in Figs. 4 - 9, a bulls eye break 20,
21 particularly as in a glass bulb housing for and automobile (not
22 shown) has a surface pit 21. In making a repair of the bulls eye
23 break 20 a cover 22 with an adhesive back 23 is engaged over the
24 pit 21 as shown in Figs. 6 - 9.

25 The resin chamber construction 10 is engaged over the pit 21

1 with the cover 22 in place. The adhesive layer 16 holds the resin
2 chamber construction 10 in place so that a selected resin, well
3 known in the art, can be pour or injected into the resin chamber
4 12, where it cures or is cured by means well known in the art.

5 The resin is poured or injected through the opening 18 in the
6 pouring spout 14 . Air and/or bubbles escape through the vents 15,
7 through the openings 17. The resin chamber 12 is selected to have
8 a depth to allow the formation of a bead 26 of sufficient
9 thickness to protect the light bulb housing 24 and allow light to
10 pass through the bead 26 and the cover 22 with a minimum of
11 attenuation.

12 As shown in Figs. 7 and 8, the light diffusion pattern lines 25
13 of the unbroken portion of the light bulb housing 24 show through
14 the repair with a minimum of attenuation. As shown in Fig. 8 with
15 the resin chamber construction 10 removed, the bead 26, though
16 extending beyond the outer surface of the light bulb housing 24,
17 substantially maintains the appearance of the light bulb housing
18 24.

19 As shown in Fig. 9, the bulls eye break 20 does not have to be
20 filled in order to restore the light bulb housing 24 to usability.
21 The cover 22 with the adhesive back 23 are all contained within
22 the bead 26.

23 The resin chamber construction 10 is a great advance in the
24 art. It enables an effective repair of a light bulb housing 24
25 break or lens break, without the difficult task of having to

1 remove it.

2 The integral pouring spout 14, opening into the resin chamber
3 12 and to the atmosphere, from outside the resin chamber
4 construction 10 and the vents 15 opening into the resin chamber
5 12, openings 17 opening to the atmosphere, enable the repair.

6 The method includes adhering a cover 22 over the pit 21 or over
7 any open break with an appropriate sized cover, emplacing a resin
8 chamber construction 10 and molding a resin over the surface of
9 the broken object. This repairs the break and maximizes the normal
10 light diffusion.

11 As shown in Fig. 10, the resin chamber construction 10 also can
12 be used for an effective in situ repair of a plate of glass 27.
13 The cover 22 is applied at the pit 21 only on the outside portion
14 of the plate of glass 27. The resin chamber construction 10 is
15 engaged on the inside of the plate of glass 27. The resin is
16 conventionally used, in this instance the entire break or bulls
17 eye break 20 is filled with the resin.

18 Figs. 11 - 18 show the parts of a kit for the repair of breaks
19 in transparent automobile light bulb housings and lens.

20 Fig. 11 shows a resin chamber construction 30. The resin
21 chamber construction 30 is part of a plastic base 49 which
22 includes a peripheral flange portion 31, a resin chamber 32, a tab
23 33, a pouring spout 34, vents 35, vent opening 37, and a grid
24 pattern 39.

25 Figs. 12 and 13 show the gasket 50 with a release cover 51, tab

1 portion 52, vent inset 53, vent inset 54, pouring spout inset 55,
2 adhesive layer 56, working gasket 57, adhesive layer 58 and
3 release paper 59.

4 Figs. 14 and 15 show the cover 42 with a adhesive back 43 and
5 a release sheet 44.

6 Figs. 16 and 17 show a push pin 48 and resin container 47.

7 Fig. 18 shows a cut away of a kit of the present invention
8 mounted on a display card 60 with a blister cover 61. The blister
9 cover 61 includes a push pin blister 62 and a resin container
10 blister 63 to contain the respective push pin 48 and resin
11 container 47. The blister cover 61 includes an integral impression
12 of the resin chamber construction 30 which is shown cut out of the
13 blister cover 61 in Fig. 11.

14 Shown within the blister cover 61 are the gasket 50, cover 42,
15 push pin 48, and resin container 47.

16 The resin chamber construction 30 is physically cut out of the
17 blister cover 61 as shown in Fig. 11. peripheral flange portion 31
18 is shallower than the resin chamber construction 10 and includes
19 a grid pattern 39 for light diffusion.

20 In the method of making a repair the cover 42 has its release
21 sheet 44 removed. The cover 42 is then placed over the break. The
22 resin chamber construction 30 can be selected to match the
23 diffusion pattern of the broken lens. The gasket 50 has the
24 release paper 59 removed and is placed around the break and the
25 cover 42, with the adhesive layer 58 adhering to the surface of

1 the lens or glass to be repaired with the tab portion 52
2 substantially vertical. The release cover 51 is then removed and
3 resin chamber construction 30 is then engaged over the gasket 50
4 and adhered to the adhesive layer 56.

5 The vents 35 must be aligned with the vent inset 53 and vent
6 inset 54 and the pouring spout 34 aligned with the pouring spout
7 inset 55. The push pin 48 is then used to puncture the pouring
8 spout 34. The push pin 48 is also used to puncture the resin
9 container 47. Resin from the resin container 47 is then put into
10 the pouring spout 34 at the puncture to fill the resin chamber 32.

11 In the event the openings 37 are not exposed the push pin 48
12 can be used to open the vents 35. The repair is substantially
13 identical to the repair as shown in Figs. 7 - 9 with the thickness
14 of the bead 26 defined by the thickness of the resin chamber 32
15 and of the working gasket 57.

16 As shown in Fig. 19 - 24 another resin chamber construction 70
17 has a flange portion 71, resin chamber 72, pouring spout 74, vents
18 75, openings 77, and a grid pattern 79. The shape and contour is
19 shown in Fig. 20. There is a cover 82 with an adhesive back 83 and
20 a release sheet 84. A gasket 90, as shown in Fig. 24, has a cover
21 91, a adhesive layer 96, a working gasket 97, an adhesive layer 98
22 and a release paper 99. As part of a kit a Fig. 25 shows a pair
23 of syringes, syringe 101 for resin and syringe 102 for hardener.
24 In Fig. 26 a pair of syringes are shown for pigment. Syringe 103
25 for red and syringe 104 for amber.

1 As shown in Fig. 27, a transparent cover 82 with release sheet
2 84 removed is adhered over a ragged break 110 in a light bulb
3 housing 111. As shown in Fig. 28, the cover 82 is trimmed to
4 overlap the break 110. As shown in Fig. 29, the working gasket 97
5 is affixed to the light bulb housing 111 surrounding the trimmed
6 cover 82. As shown in Fig. 30, the resin chamber construction 70
7 is engaged on the working gasket 97 (not shown). As shown in Fig.
8 31 the resin is mixed, as is well known in the art, optionally
9 including a selected pigment and withdrawn into a syringe 101. As
10 shown in Fig. 32, the resin is injected into the pouring spout 74
11 to complete the repair. The repair includes a mold of the grid
12 pattern 79, which is selected to simulate the diffusion pattern of
13 the basic lens light bulb housing 111.

14 The configuration of the resin chamber construction 70
15 maintains the combination of novel elements of the present
16 invention, the combination of resin chamber construction 70
17 including a chamber 72 engagable on the outside of a lens or
18 housing, in situ, or even on the inside of plate glass in situ.
19 A basic pouring spout 74 must open to the chamber 72. The chamber
20 72 must also be vented on the same plane so that the entire repair
21 can be poured and vented from the same side.

22 The resin chamber construction enables an in situ repair
23 maximizing the security of a housing or of a lens. The resin
24 chamber construction of the present invention also facilitates an
25 improved repair of plate glass.

1 The terms and expressions which are employed are used as
2 terms of description; it is recognized, though, that various
3 modifications are possible.

4 It is also understood the following claims are intended to
5 cover all of the generic and specific features of the invention
6 herein described; and all statements of the scope of the invention
7 which as a matter of language, might fall therebetween.

8

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